PB-220 002

EVALUATION OF THE AIR-JET DEVICE-AIR BLEED

Henry L. Gompf

Environmental Protection Agency
Ann Arbor, Michigan

August 1972

DISTRIBUTED BY:

NTIS

National Technical Information Service
U. S. DEPARTMENT OF COMMERCE
5285 Port Royal Road, Springfield Va. 22151

BIBLIOGRAPHIC DATA SHEET	1. Report No. APTD-1377	2.	PB 220 002

4. Title and Subtitle

Evaluation of the Air-Jet Device - Air Bleed

5. Report Date: August 1972

6.

7. Author(s): Henry L. Gompf

8. Performing Organization Rept. No.

9. Performing Organization Name and Address

ENVIRONMENTAL PROTECTION AGENCY
Control Device Evaluation Section
Ann Arbor, Michigan

10. Project/Task/Work Unit No.

11. Contract/Grant No.

12. Sponsoring Organization Name and Address

Same

13. Type of Report & Period Covered: Inhouse

14.

15. Supplementary Notes

16. Abstracts

A test program was initiated to evaluate the Air-Jet device. This device is basically an engine vacuum actuated valve which allows air to bleed into the engine's PCV system and subsequently to the intake manifold. The device is installed in the PCV line between the crankcase and the carburetor. Installation of the system requires cutting the PCV line and inserting the Air-Jet unit. Baseline and device tests were conducted using a 1970 Valiant equipped with automatic transmission and 225 CID six-cylinder engine. A total of four baseline and four device tests were conducted using the 1975 Federal cold start emission tests. The installation of Air-Jet resulted in moderate reductions of carbon monoxide emissions from the vehicle tested. It did not appear to have any effect on either hydrocarbon or nitrogen oxides emissions beyond changes attributable to normal test variability.

17. Key Words and Document Analysis. 17a. Descriptors

Air pollution
Exhaust emissions
Carnkcase fumes
Air pollution control equipment
Manifolds
Tests
Standards
Carbon monoxide
Hydrocarbons
Nitrogen oxides
Vehicles

17b. Identifiers/Open-Ended Terms

Air-Jet device
Air bleed device
Federal Test Procedure (1975)

17c. COSATI Field/Group 13B

18. Availability Statement: Unlimited

Reproduced by NATIONAL TECHNICAL INFORMATION SERVICE
U S Department of Commerce
Springfield VA 22151

19. Security Class (This Report): UNCLASSIFIED

21. No. of Pages: 5

20. Security Class (This Page): UNCLASSIFIED

22. Price: $3.00

FORM NTIS-35 (REV. 3-72)

USCOMM-DC 14952-P72

73-2

APTD-1377

Evaluation of the Air-Jet Device — Air Bleed

August 1972

Henry L. Gompf
Control Device Evaluation Section
Environmental Protection Agency

Background

Albano Enterprises, manufacturer of the Air-Jet device, contacted the Office of Air Programs to request a laboratory and engineering evaluation of their device. Supplied with the request was a test report prepared by Olson Laboratories of Anaheim, California. The test utilized the cold start 1972 Federal emission test procedure and indicated 14% reduction in hydrocarbon, 20% reduction in carbon monoxide and 31% reduction in oxides of nitrogen on a 1969 Dodge Dart with the Air-Jet installed. A confirmatory test program was initiated by the Test and Evaluation Branch.

Device Description

The Air-Jet device is basically an engine vacuum actuated valve which allows air to bleed into the engine's PCV system and subsequently to the intake manifold. The device is installed in the PCV line between the crankcase and the carburetor. Technical data supplied by Albano Enterprises states that "Air-Jet does not function during the idle cycle. At idle the engine vacuum is at its maximum, causing the actuator valve to close. The actuator valve remains closed until the car is accelerated to 38 to 40 miles per hour. At this point, the engine vacuum decreases, causing the compression spring to overcome the vacuum, letting the actuator valve gradually open. As the speed increases, vacuum continues to decrease, letting the valve open until it reaches its maximum open position between 60 to 65 miles per hour." It should be noted that while it is claimed that initial air flow is allowed at 38 mph, technically, low speed accelerations would subject the valve to vacuums low enough to allow air flow into the PCV line.

Installation of the system requires cutting the PCV line and inserting the Air-Jet unit (about 5 minutes).

While no cost data was supplied with the system it is estimated that installed cost to the consumer would be less than twenty dollars.

Test Program

Baseline and device tests were conducted using a 1970 Valiant equipped with an automatic transmission and 225 CID six-cylinder engine. A total of four baseline and four device tests were conducted using the 1975 Federal cold start emission tests. Details of this test procedure are presented in the November 10, 1970, and July 2, 1971, Federal Registers.

Test Results

Data based on the 1975 and 1972 Federal test procedures are presented in the Appendix of this report. In summary, the installation of Air-Jet resulted in the following reductions from baseline:

	1972 FTP	1975 FTP
Hydrocarbon	0%	6%
Carbon Monoxide	10%	16%
Carbon Dioxide	1%*	0%
Oxides of Nitrogen	0%	2%

Conclusions

The installation of Air-Jet resulted in moderate reductions of carbon monoxide emissions from the vehicle tested. It did not appear to have any effect on either hydrocarbon or oxides of nitrogen emissions beyond changes attributable to normal test variability.

* increase

1975 Federal Emission Test Results
(all results in grams per mile)

	HC	CO	CO_2	NOx
Baseline				
6/22/72	1.8	18.0	408.7	6.4
6/23/72	2.1	17.4	417.6	6.4
7/05/72	1.8	16.1	437.4	6.3
7/06/72	1.5	15.6	408.9	5.8
Average	1.8	16.8	418.2	6.2
Air-Jet				
6/24/72	1.6	12.7	415.0	6.0
6/29/72	1.8	16.2	421.3	6.4
6/30/72	1.6	14.5	409.2	5.6
7/03/72	1.7	14.4	432.5	6.5
Average	1.7	14.5	419.5	6.1
Percent Reduction	6%	16%	0%	2%

1972 Federal Emission Test Results
(all results in grams per mile)

	HC	CO	CO_2	NOx
Baseline				
6/22/72	2.2	32.5	413.0	6.0
6/23/72	2.1	31.6	423.8	6.1
7/05/72	2.0	29.5	437.4	5.8
7/06/72	1.8	28.6	409.8	5.5
Average	2.0	30.6	421.0	5.9
Air-Jet				
6/24/72	1.9	24.4	422.3	5.8
6/29/72	2.2	30.4	425.6	6.2
6/30/72	1.9	27.5	411.3	5.2
7/03/72	2.0	27.5	440.6	6.4
Average	2.0	27.5	425.0	5.9
Percent Reduction	0%	10%	1%*	0%

*increase